AF/GP3721

PATENT APPLICATION

IFW

Applicant : Hiroaki KITAMOTO

Title : CAPPING METHOD AND APPARATUS

Serial No. : 09/777 378 Group: 3721

Confirmation No.: 8381

Filed : February 6, 2001 Examiner: Nash

Atty. Docket No.: Kanzaki Case 161

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

FIRST CLASS MAILING CERTIFICATE

Sir:

I hereby certify that this correspondence is being deposited with the United States Postal Service under 37 CFR 1.8 as first class mail in an envelope addressed to: Commissioner for Patents P.O. Box 1450, Alexandria, VA 22313-1450, on August 12, 2004.

Terryence F. Chapman

TFC/smd

FLYNN, THIEL, BOUTELL & TANIS, P.C.
2026 Rambling Road
Kalamazoo, MI 49008-1631
Phone: (269) 381-1156
Fax: (269) 381-5465

Dale H. Thiel Reg. No. 24 323
David G. Boutell Reg. No. 25 072
Ronald J. Tanis Reg. No. 22 724
Terryence F. Chapman Reg. No. 32 549
Mark L. Maki Reg. No. 36 589
Liane L. Churney Reg. No. 40 694
Brian R. Tumm Reg. No. 36 328
Steven R. Thiel Reg. No. 53 685
Donald J. Wallace Reg. No. 43 977
Sidney B. Williams, Jr. Reg. No. 24 949

Correspondence: Response to Notification of Non-Compliance dated August 12, 2004 including enclosures listed thereon

190.05/03

PATENT APPLICATION

IN THE U.S. PATENT AND TRADEMARK OFFICE

August 12, 2004

Applicant: Hiroaki KITAMOTO

For: CAPPING METHOD AND APPARATUS

Serial No.: 09/777 378 Group: 3721

Confirmation No.: 8381

Filed: February 6, 2001 Examiner: Nash

Atty. Docket No.: Kanzaki Case 161

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO NOTIFICATION OF NON-COMPLIANCE WITH 37 CFR 1.192(c)

Sir:

Appellant has received a Notification of Non-Compliance from the Patent Office, dated July 12 2004, stating that the brief does not contain the items required under 37 CFR 1.192(c). Specifically speaking, the Examiner states that a single ground of rejection has been applied to two or more claims in the application and the brief includes the statement that one or more claims do not stand or fall together and yet does not present arguments in support thereof in the arguments section of the brief. Additionally, the Examiner states that the brief does not present an argument under a separate heading for each issue on appeal.

Addressing the last item first, 37 CFR 1.192(c)(8) does not make it mandatory that each issue be treated under a separate heading. The language stated in this section is that "each issue should be treated under a separate heading". In fact, MPEP § 1206 dealing with the "argument" heading for an appeal brief on MPEP page 1200-11 has no statement at all with respect to the supposed requirement made by the Examiner. Once again, Appellant's representative points out that the putting of each issue under a separate heading is not

mandatory because of the "should" language and, therefore, is not properly a basis for rejecting the previously filed appeal brief.

With respect to the Examiner's statement that Appellant does not explain why the grouping of claims are separately patentable, the grouping of claims referred to by the Examiner must be Claims 13 and 18, Group 2, and Claims 15 and 20, Group 3, which are the only two groups of claims covered by the same ground of rejection. In the appeal brief, in the penultimate paragraph under the arguments section, it is pointed out why Claims 13 and 18 are felt to be patentable over the prior art cited by the Examiner and the last paragraph explains that Claims 15 and 20 have an additional limitation with respect to the vertical load which further patentably distinguishes Claims 15 and 20 over the prior art and Claims 13 and 18. Appellant respectfully submits that arguments were presented as to why the claims subject to the same rejection are separately patentable. Favorable consideration is respectfully solicited.

Although Appellant's representative strenuously disagrees with the Examiner's positions with respect to the form of the appeal brief, a Supplemental Appeal Brief in triplicate is enclosed herewith which hopefully satisfies the Examiner.

Respectfully submitted,

Terryence F. Chapman

TFC/smd

FLYNN, THIEL, BOUTELL & TANIS, P.C.
2026 Rambling Road
Kalamazoo, MI 49008-1631
Phone: (269) 381-1156
Fax: (269) 381-5465

Dale H. Thiel	Reg. No. 24 323
David G. Boutell	Reg. No. 25 072
Ronald J. Tanis	Reg. No. 22 724
Terryence F. Chapman	Reg. No. 32 549
Mark L. Maki	Reg. No. 36 589
Liane L. Churney	Reg. No. 40 694
Brian R. Tumm	Reg. No. 36 328
Steven R. Thiel	Reg. No. 53 685
Donald J. Wallace	Reg. No. 43 977
Sidney B. Williams, Jr.	Reg. No. 24 949

Encl: Supplemental Appellant's Brief on Appeal
Postal Card

PATENT APPLICATION

IN THE U.S. PATENT AND TRADEMARK OFFICE

August 12, 2004

Applicant: Hiroaki KITAMOTO

For: CAPPING METHOD AND APPARATUS

Serial No.: 09/777 378 Group: 3721

Confirmation No.: 8381

Filed: February 6, 2001 Examiner: Nash

Atty. Docket No.: Kanzaki Case 161

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

SUPPLEMENTAL APPELLANT'S BRIEF ON APPEAL

Sir:

This is an appeal from the decision of the Examiner dated January 29, 2004, finally rejecting Claims 11-15 and 17-22.

REAL PARTY IN INTEREST

Shibuya Kogyo Co., Ltd. is the assignee of the present application and the real party in interest.

RELATED APPEALS AND INTERFERENCES

There are no related appeals and interferences to the present application.

STATUS OF CLAIMS

Claims 11-15 and 17-22 are pending and are the claims on appeal. Claims 1-10 and 16 have been canceled.

STATUS OF AMENDMENTS

An Amendment After Final Rejection has not been filed in the present application.

SUMMARY OF INVENTION

Appellant's invention, as defined by independent Claim 21, is directed to a method of clamping a cap onto a vessel which comprises the steps of providing a cap having threads, a vessel having threads with a predetermined winding angle adapted to engage with the threads of the cap, a capping head holding the cap and a motor for rotating the capping head in a clamping direction, rotating the cap and the vessel relatively with respect to each other at an elevation where the threads on the cap and vessel are not engaged with each other, measuring the torque acting on the cap when the distal ends of the threads of the cap and vessel come into contact with each other to detect an incipient position of meshing engagement where the distal ends of both threads contact with each other and rotating the cap in a clamping direction by a predetermined rotational angle with respect to the incipient position of meshing engagement to clamp the cap to the vessel (specification page 2, lines 15-24 and specification pages 15-17 under the description of the "third embodiment").

Claim 11 limits Claim 12 in further comprising the steps of causing the cap held by the capping head to descend and fit around a mouth of the vessel, stopping the descent at an elevation where the distal end of the threads of the cap abut against the distal ends of the threads of the vessel, rotating the cap until a position is reached where at least the distal ends of both threads of the cap and vessel abut against each other while measuring a change in the force acting on the cap under a condition of the descent having ceased and detecting a position where an increase occurs in the acting force as an incipient position of meshing engagement where the distal ends of both threads first contact each other (specification page 15, lines 10-24 and specification page 16, lines 1-11).

Claim 12 limits Claim 21 in further comprising the steps of causing the cap held by the capping head to descend and fit around a mouth of the vessel, rotating the cap in a direction opposite the clamping direction until a rotational position is

reached where at least the distal end of the thread from the cap disengages from the threads on a vessel while measuring a change in the force acting on the cap and detecting a position where the acting force changes from increasing to decreasing as an incipient position of meshing engagement where the distal ends of both threads first contact each other (specification page 13, lines 5-24 and specification page 14, lines 1-3).

Claim 13 limits Claim 21 in further comprising the steps of causing the cap held by the capping head to descend and fit around a mouth of the vessel, rotating the cap in a clamping direction during its descent at such a speed that the cap rotates through at least one revolution while it descends by a vertical distance corresponding to the width of one of the threads on the vessel, continuing the rotation of the cap in a clamping direction until a rotational position is reached where at least the distal ends of both threads on the cap and the vessel abut each other while measuring a change in the force acting on the cap and detecting a position where a change in the acting force occurs as an incipient position of meshing engagement where the distal ends of both threads first contact each other (specification page 15, lines 20-24).

Claim 14 limits Claim 21 in requiring that a rotational load acting on the cap is measured as the acting force (specification page 6, lines 15 and 16).

Claim 15 limits Claim 21 in requiring that a vertical load acting on the cap is measured as the acting force (specification page 20, lines 16-18).

Appellant's invention, as defined in independent Claim 22, is directed to a capping apparatus for clamping a cap onto a vessel. The apparatus comprises a capping head for holding a cap having threads, a motor for rotating the capping head in a clamping direction so that the cap can be clamped onto a vessel having threads with a predetermined winding angle adapted to engage with the threads of the cap, an elevating mechanism for raising the capping head up and down,

a measuring means for measuring torque acting on the cap held by the capping head, angle detecting means for detecting an angular position to which the capping head is rotated and control means for rotating the cap on the vessel relatively with respect to each other at an elevation where the threads on the cap and the vessel are not engaged with each other, measuring the torque acting on the cap when the distal ends of the threads of the cap and vessel come into contact with each other to detect an incipient position of meshing engagement where the distal ends of both threads contact with each other and rotating the cap in a clamping direction by a predetermined rotational angle with respect to the incipient position of meshing engagement to clamp the cap to the vessel (specification page 3, lines 1-22).

Claim 17 limits Claim 22 in requiring that the elevating mechanism cease the descent of the capping head at an elevation where the clamping of the cap onto the vessel is to be initiated (specification page 7, lines 4-21).

Claim 18 limits Claim 22 in requiring that the elevating mechanism and the control means are arranged so that the cap is rotated in the clamping direction during its descent at such a speed that the cap rotates through at least one revolution while it descends by a vertical distance corresponding to the width of one of the threads of the vessel (specification page 15, lines 20-24).

Claim 19 limits Claim 22 in requiring that the control means measure a rotational load acting on the cap as the acting force (specification page 6, lines 15-20).

Claim 20 limits Claim 22 in requiring that the control means measure a vertical load acting on the cap as the acting force (specification page 20, lines 1-9).

ISSUES

The first issue presented for review is whether Claims 11, 12, 14, 17, 19, 21 and 22 are unpatentable under 35 USC 103(a) over JP 2050243 to Yukiari et al in view of U.S. Patent

No. 5 321 935 to Spatz et al and further in view of U.S. Patent No. 6 105 343 to Grove et al. The second issue presented for review is whether Claims 13, 15, 18 and 20 are unpatentable under 35 USC 103(a) over Yukiari et al in view of Spatz et al and further in view of Grove et al and further in view of U.S. Patent No. 5 685 552 to Barca.

GROUPING OF CLAIMS

The claims do not all stand or fall together. Claims 11, 12, 14, 17, 19, 21 and 22 are directed to a first separately patentable invention, Claims 13 and 18 are directed to a second separately patentable invention and Claims 15 and 20 are directed to a third separately patentable invention.

ARGUMENT

The presently claimed invention is directed to a method for clamping a cap onto a vessel which comprises the steps of providing a cap having threads, a vessel having threads with a predetermined winding angle adapted to engage with the threads of the cap, a capping head holding the cap and a motor for rotating the capping head in a clamping direction, rotating the cap and the vessel relatively with respect to each other at an elevation where the threads on the cap and vessel are not engaged with each other, measuring the torque acting on the cap when the distal ends of the threads of the cap and vessel come into contact with each other to detect an incipient position of meshing engagement where the distal ends of both threads contact with each other and rotating the cap in a clamping direction by a predetermined rotational angle with respect to the incipient position of meshing engagement to clamp the cap to the vessel.

Another aspect of the present invention is directed to a capping apparatus for performing the above-described method. The capping apparatus comprises a capping head for holding a cap having threads, a motor for rotating the capping head in a clamping direction so that the cap can be clamped onto a

vessel having threads with a predetermined winding angle adapted to engage with the threads of the cap, an elevating mechanism for raising the capping head up and down, measuring means for measuring the torque acting on the cap held by the capping head, angle detecting means for detecting an angular position to which the capping head is rotated and control means for rotating the cap and the vessel relatively with respect to each other at an elevation where the threads on the cap and the vessel are not engaged with each other, measuring the torque acting on the cap when the distal ends of the threads of the cap and vessel come into contact with each other to detect an incipient position of meshing engagement where the distal ends of both threads contact with each other and rotating the cap in a clamping direction by a predetermined rotational angle with respect to the incipient position of meshing engagement to clamp the cap to the vessel.

The present invention provides a method and apparatus for determining the precise incipient position of meshing engagement of the distal ends of threads on a cap and threads on a vessel to be detected independently of the influence of temperature or humidity. An operating force acting on the cap as the distal ends of the threads of the cap and the vessel first contact with each other is detected by different means to determine the incipient position of meshing engagement. After the incipient position is determined, the cap is then rotated in a clamping direction by a predetermined angle. This enables the cap to be attached to the vessel based on the incipient position of meshing engagement so that the tightness of the cap after it is attached to the vessel is constant since the cap is turned through a given angle of rotation based on the initial contact position of the threads of the cap and the vessel. This enables all of the caps applied to the vessels to be uniformly clamped thereon. It is respectfully submitted that the prior art cited by the Examiner does not disclose the presently claimed invention.

REJECTION OF CLAIMS 11, 12, 14, 17, 19, 21 AND 22 UNDER 35 USC 103(a)

The Yukiari reference discloses a container gripping mechanism 2 which grips a container 1, a controller 8 for lowering a torque motor 3 and a capping head 4 so that a cap 5 can engage with a mouth of a container 1. The controller makes the torque motor rotate counter-clockwise which gradually raises the capping head 4 up along slopes of the screw parts of the cap 5 and the container 1. When the tip ends of the screw parts of the cap 5 and the container 1 come out of a mutual engagement, the capping head drops down suddenly. The controller stores the position where the capping head drops down suddenly by means of a signal of a position detector 9 as a fastening starting position and stops the rotation. The controller then rotates the capping head in a fastening direction and stops the rotation after rotating by predetermined angle from the fastening starting position upon a signal from the rotation detector 6.

As admitted by the Examiner in the final rejection, the Yukiari reference does not disclose the measurement of torque acting on the cap at any point during its fastening process. Additionally, this reference does not disclose the rotation of the cap and the vessel relatively with respect to each other at an elevation where the threads on the cap and vessel are not engaged with each other, stopping of the descent of the cap at an elevation where the distal ends of the thread of the cap abut against the distal end of the threads of the vessel, rotating the cap until a position is reached where at least the distal ends of both threads on the cap and vessel abut against each other while measuring a change in the force acting on the cap under a condition of the cap's descent having stopped, detecting a position where an increase occurs in the acting force as an incipient position of meshing engagement where the distal ends of both threads first contact each other, rotating the cap in a clamping direction during its descent at such a speed that the cap rotates through at

least one revolution while it descends by vertical distance corresponding to the width of one of the threads on the vessel or measuring a vertical load acting on the cap as the acting force. Consequently, the secondary references cited by the Examiner must provide the motivation to one of ordinary skill in the art to make these changes to the primary Yukiari reference in order to present a showing of prima facie obviousness with respect to the presently claimed invention. It is respectfully submitted that the secondary references cited by the Examiner contain no such disclosure.

The Spatz et al reference discloses a slewing device for screw caps and method for putting screw caps on containers in which a drive torque is applied to a screw closure to screw it down onto the container, an instantaneous drive torque applied to the screw closure sensed and compared with a closing torque having a predetermined value and an angular rotation of the screw closure sensed only upon the instantaneous drive torque reaching the predetermined value of the closing torque. This reference was cited by the Examiner as teaching an apparatus and method wherein a change in force on the cap, i.e. torque on the cap, is measured while rotating the cap to a predetermined torque through at least one complete revolution and stopping the rotation after the predetermined torque is achieved.

However, Spatz et al has no disclosure with respect to measuring the torque acting on the cap when the distal ends of the threads of the cap and the vessel come into contact with each other to detect an incipient position of meshing engagement where the distal ends of both threads contact with each other as an incipient position of meshing engagement and the rotation of the cap through a predetermined angle to finally fasten the cap from the incipient position. The application Moment 1 in Spatz occurs after the threads of the closure 3 and the container 1 have already engaged with each other and not when the threads on the screw closure and the container first come into contact with each other.

Additionally, Spatz et al has no disclosure with respect to rotating the screw closure 3 at an elevation above the threads of the container 1. As such, it is respectfully submitted that the Spatz et al reference does not supply, with respect to the presently claimed invention, the teachings missing in the primary Yukiari et al reference.

The Grove et al reference discloses an apparatus and method for a capping machine. The capping machine comprises a rotatable turret and a rotatable cap chuck which grips the cap and positions the cap on the container. The cap chuck is rotated by a spindle driven by a servo-motor at adjustable and reversible rotational velocities independent of the rotational velocity of the turret. The number of rotations of the cap is determined by monitoring the number of rotations of the servo-motor compared to the number of rotations of the turret and is transmitted to a spindle drive control. The torque imparted to the cap is monitored by a torque monitor and is transmitted to the spindle drive control. The rotational velocity of the cap is adjustable in response to the compared monitored number of rotations and monitored torque. The capped container is released from the cap chuck after a selected number of rotations of the cap onto the container has been made. Caps applied outside a selected range of monitored torques and number of rotations are tracked and rejected.

The Grove et al reference was cited by the Examiner as disclosing the rotation of the cap prior to engagement and at an elevation prior to being lowered into contact with a container. For a given size, pitch and depth of the threads of cap 12 and the corresponding threads of container 14, a selected amount of rotations is imparted to the cap on the container to cause the cap to move to a selected position on the container. The amount of rotation of the cap determines the position of the cap on the container and in this way, completion of capping is determined. Capping is complete when a selected amount of rotation of the cap has been made as it is threaded onto the container. However, the Grove et al

reference has no disclosure with respect to using the torque acting on the cap when the distal ends of the threads of the cap and vessel come into contact with each other to detect an incipient position of meshing engagement where the distal ends of both threads contact with each other. Additionally, although this reference discloses that the spindle drive motor 24 may turn in a clockwise or counter-clockwise direction, this is to enable the machine to be used in a right-handed or left-handed capping operation. This reference has no disclosure with respect to rotating the cap in an opposite direction to the capping direction to determine an incipient position of meshing engagement. Since none of the three previously discussed references disclose the basic step of measuring the torque acting on the cap when the distal ends of the threads of the capping vessel come in contact with each other to detect an incipient position of meshing engagement where the distal ends of both threads contact with each other and then the subsequent rotation of the cap in a clamping direction by a predetermined rotational angle to clamp the cap to the vessel, it is respectfully submitted that the subject matter of Claims 11, 12, 14, 17, 19, 21 and 22 are not disclosed by the combination of Yukiari et al, Spatz et al and Grove et al.

REJECTION OF CLAIMS 13, 15, 18 AND 20
UNDER 35 USC 103(a)

Claims 13 and 18 have the limitation that the cap is rotated in the clamping direction during its descent at such a speed that the cap rotates through at least one revolution while it descends by a vertical distance corresponding to the width of one of the threads on the vessel. This assures that the lower extremity of the female threads on the cap abuts against the top end of the male threads of the vessel during the rotation through one revolution. None of the references cited by the Examiner disclose this process step and, as such, it is respectfully submitted that Claims 13 and 18 are

separately patentable over the prior art cited by the Examiner.

Claims 15 and 20 are separately patentable from Claims 13 and 18 because they require the separately patentable limitation that a vertical load acting on the cap is measured as the acting force. The Barca reference has been cited by the Examiner as teaching the measuring of the axial load on a cap and the use of an adapter to rotate the screw head in the clamping direction while descending the cap toward the container in order to minimize the creation of particulate matter. However, Appellant respectfully submits that there is no disclosure of measuring the axial load in Barca. Barca discloses the imposition of predetermined axial capping loads during the installation of a cap on a vessel but these axial capping loads are not measured during the capping operation and are actually predetermined prior to the capping operation. In contrast thereto, Claims 15 and 20 require that a vertical load acting on the cap be measured as the acting force. Since Barca has no disclosure with respect to measuring a vertical load during the capping operation, Claims 15 and 20 are clearly separately patentable over the prior art cited by the Examiner.

CONCLUSION

For the reasons advanced above, it is respectfully submitted that Claims 11-15 and 17-22 are patentable over the prior art cited by the Examiner. Reversal of the Examiner's rejection of the claims is respectfully solicited.

Respectfully submitted,

IN TRIPLICATE

Terryence F. Chapman

TFC/smd

FLYNN, THIEL, BOUTELL
& TANIS, P.C.
2026 Rambling Road
Kalamazoo, MI 49008-1631
Phone: (269) 381-1156
Fax: (269) 381-5465

Dale H. Thiel Reg. No. 24 323
David G. Boutell Reg. No. 25 072
Ronald J. Tanis Reg. No. 22 724
Terryence F. Chapman Reg. No. 32 549
Mark L. Maki Reg. No. 36 589
Liane L. Churney Reg. No. 40 694
Brian R. Tumm Reg. No. 36 328
Steven R. Thiel Reg. No. 53 685
Sidney B. Williams, Jr. Reg. No. 24 949

Encl: Appendix

110.0703

APPENDIX

21. A method of clamping a cap onto a vessel comprising the steps of:

providing a cap having threads, a vessel having threads with a predetermined winding angle adapted to engage with the threads of the cap, a capping head holding said cap and a motor for rotating the capping head in a clamping direction;

rotating the cap and the vessel relatively with respect to each other at an elevation where the threads on the cap and vessel are not engaged with each other;

measuring the torque acting on the cap when the distal ends of the threads of the cap and vessel come into contact with each other to detect an incipient position of meshing engagement where the distal ends of both threads contact with each other; and

rotating the cap in a clamping direction by a predetermined rotational angle with respect to the incipient position of meshing engagement to clamp the cap to the vessel.

11. The method of Claim 21, further comprising the steps of:

causing the cap held by the capping head to descend and fit around a mouth of the vessel;

stopping the descent at an elevation where the distal end of the threads on the cap abut against the distal end of the threads on the vessel;

rotating the cap until a position is reached where at least the distal ends of both threads on the cap and vessel abut against each other while measuring a change in the force acting on the cap under a condition of the descent having ceased; and

detecting a position where an increase occurs in the acting force as an incipient position of meshing engagement

where the distal ends of both threads first contact each other.

12. The method of Claim 21, further comprising the steps of:

causing the cap held by the capping head to descend and fit around a mouth of the vessel;

rotating the cap in a direction opposite to the clamping direction until a rotational position is reached where at least the distal end of the threads on the cap disengage from the threads on the vessel while measuring a change in the force acting on the cap; and

detecting a position where the acting force changes from increasing to decreasing as an incipient position of meshing engagement where the distal ends of both threads first contact each other.

13. The method of Claim 21, further comprising the steps of:

causing the cap held by the capping head to descend and fit around a mouth of the vessel;

rotating the cap in the clamping direction during its descent at such a speed that the cap rotates through at least one revolution while it descends by a vertical distance corresponding to the width of one of the threads on the vessel;

continuing the rotation of the cap in the clamping direction until a rotational position is reached where at least the distal ends of both threads on the cap and the vessel abut each other while measuring a change in the force acting on the cap; and

detecting a position where a change in the acting force occurs as an incipient position of meshing engagement where the distal ends of both threads first contact each other.

14. The method of Claim 21, in which a rotational load acting on the cap is measured as the acting force.

15. The method of Claim 21, in which a vertical load acting on the cap is measured as the acting force.

22. A capping apparatus for clamping a cap onto a vessel, said apparatus comprising:

a capping head for holding a cap having threads;

a motor for rotating the capping head in a clamping direction so that the cap can be clamped onto a vessel having threads with a predetermined winding angle adapted to engage with the threads of the cap;

an elevating mechanism for raising the capping head up and down;

measuring means for measuring torque acting on the cap held by the capping head;

angle detecting means for detecting an angular position to which the capping head is rotated; and

control means for rotating the cap and the vessel relatively with respect to each other at an elevation where the threads on the cap and the vessel are not engaged with each other, measuring the torque acting on the cap when the distal ends of the threads of the cap and vessel come into contact with each other to detect an incipient position of meshing engagement where the distal ends of both threads contact with each other and rotating the cap in a clamping direction by a predetermined rotational angle with respect to the incipient position of meshing engagement to clamp the cap to the vessel.

17. The capping apparatus of Claim 22, wherein the elevating mechanism ceases the descent of the capping head at an elevation where the clamping of the cap onto the vessel is to be initiated.

18. The capping apparatus of Claim 22, wherein the elevating mechanism and the control means are arranged so that the cap is rotated in the clamping direction during its descent at such a speed that the cap rotates through at least one revolution while it descends by a vertical distance corresponding to the width of one of the threads on the vessel.

19. The capping apparatus of Claim 22, wherein the control means measures a rotational load acting on the cap as the acting force.

20. The capping apparatus of Claim 22, wherein the control means measures a vertical load acting on the cap as the acting force.